REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 1 and 2 are currently being amended. Claims 3-9 are being added. The subject matter of the amendments and the new claims is supported by the Original Specification at least for example at, page 9, line 20 to page 10, line 5 and Figs. 1-4. Thus, no new mater is added.

Claims 1-2 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C 103(a) as obvious over Ashibe et al. (JP 2002-238144; hereinafter Ashibe JP). Claims 1-2 are rejected under 35 U.S.C. 102(b) as anticipated by or , in the alternative, under 35 U.S.C. 103(a) as obvious over Ashibe et al. (WO 02/065605 as evidenced by U.S. Patent No. 6,888,060; hereinafter Ashibe US). These rejections are respectfully traversed.

As amended claim 1 recites, a terminal structure of a superconducting cable that includes,

> the gaseous refrigerant remains in a volume between the inner surface of the refrigerant bath and the outer periphery of the bushing; wherein liquid Nitrogen is used as the liquid refrigerant and a pressure of the liquid refrigerant layer is maintained in the range of about 0.3 to about 0.5 MPa; wherein the distance between the inner surface of the refrigerant bath and the outer periphery of the bushing for the gaseous layer is in the range of about 0.1 to about 2.5 mm; and a longitudinal dimension of the volume occupied by the gaseous refrigerant layer is in the range of about 300 mm to about 500 mm. (*emphasis added*)

Ashibe JP or Ashibe US, alone or in combination fail to teach or suggest at least the above recited features of claim 1. Ashibe JP fails to teach or suggest the pressure of the liquid refrigerant layer is maintained in the range of 0.3 to 0.5 MPa; the distance between the inner surface of the refrigerant bath and the outer periphery of the bushing is in the range of 0.1 to 2.5 mm; and a longitudinal dimension the volume occupied by the gaseous refrigerant layer is in the range of 300 – 500 mm. Ashibe JP does not disclose the gaseous refrigerant

layer with the above ranges because Ashibe JP uses a vacuum insulating part 71 that separates the cryogenic side from the room temperature side. (Ashibe JP, Means of solving the problem, ¶ 11) Ashibe JP requires the use of an vaccum insulating part 71 that is physically separated by a flange 62 from the liquid refrigerant 11. Embodiments of the present invention eliminate the need for a vacuum insulating part between the cryogenic side and the room temperature side by dimensioning the gaseous refrigerant layer container between the claimed ranges. Therefore Ashibe JP fails to teach or suggest the structure of claim 1 including at least the above-discussed features recited in claim 1.

Ashibe US fails to teach or suggest at least the above recited features of claim 1. Instead, similar to Ashibe JP, Ashibe US teaches having a connecting/heat-insulating portion 300 that separates the very low temperature portion 200 and the room temperature potion 400. (Column 10, lines 62-65) The a connecting/heat-insulating portion 300 is described as being adiathermancy and thus, portion 300 is used for provided thermal insulation as compared to the gaseous layer as claimed. (Column 10, lines 63-67) The applicants of the present invention were able to eliminate the need for a connecting/heat-insulating portion 300 between the cryogenic side and the room temperature side by dimensioning the gaseous refrigerant layer container between the claimed ranges to provide heat insulation by using the gaseous refrigerant layer located in the refrigerant bath. Moreover, features of claim 1 allow the gaseous state to be maintained by the pressure of the gaseous refrigerant (14a) itself and respective pressure of the gaseous refrigerant (14a) and the liquid refrigerant (13a) to counterbalance each other. (Original Specification, page 9, line 20 to page 10, line 17)

Therefore, Ashibe JP and Ashibe US, alone or in combination, fail to teach or suggest at least the above recited features of claim 1. Because claim 2 depends from claim 1, claim 2 is allowable for at least the same reasons claim 1 is allowable.

New claims 3-14 are added to further protect aspects of the present invention. New claims 3-9, directly or indirectly, depend from independent claim 1. Accordingly, each of the new claim 3-9 is patentably distinguishable over the references of record, at least for reasons as discussed above with respect to claim 1. In addition, each new claim 3-9 is further distinguished from the references of record.

For example, new claim 3 is dependent on claim 1, further recites, that the liquid refrigerant layer is surrounded by a portion of the inner surface of the refrigerant bath and a portion of the outer periphery of the bushing; wherein the portion of the inner surface of the refrigerant bath and the portion of the outer periphery of the bushing are separated by a distance that narrows to form a boundary between the gaseous refrigerant layer and the liquid refrigerant layer such that the distance between the inner surface of the refrigerant bath and the outer periphery of the bushing for the gaseous refrigerant layer is narrowed to at least $1/5^{th}$ of the distance between the inner surface of the refrigerant bath and the outer periphery of the bushing for the liquid refrigerant layer. (*emphasis added*) Ashibe JP or Ashibe US, alone or in combination fail to teach or suggest a structure as recited in claim 3 including a structure as recited in claim 3 including, at least the above recited features. Instead, Ashibe JP teaches a slightly narrowed gaseous layer, as shown for example in drawings 1 and 3. Similarly, Ashibe US teaches a slightly narrowed gaseous layer, as shown for example in figures 1, 3 and 4. Therefore claim 3 is patentably distinguished from and allowable over the reference of record.

For example, new claim 4 is dependent on claim 3, and further recites, a flange that separates the room-temperature side of the terminal structure from the cryogenic side of the terminal structure; wherein a distance between the cryogenic side of the flange and the boundary of the liquid refrigerant layer and the gaseous refrigerant define a length dimension of the gaseous layer, wherein the length dimension of the gaseous layer is between 120 to 5000 times greater than the distance between the inner surface of the refrigerant bath and the outer periphery of the bushing for the gaseous layer. Ashibe JP and Ashibe US fail to teach or suggest at least the relative dimensions as recited in claim 4. Therefore claim 4 is patentably distinguished from and allowable over the references of record.

For example, new claim 5 is dependent on claim 1, and incorporate every feature of claim 1 and further recites that the gaseous refrigerant layer comprises Nitrogen. Instead, Ashibe JP discloses using a gas that has a boiling point lower than a refrigerant of a very-low-temperature part. (Ashibe JP, ¶ 17) That means that the gas that is used is different than the refrigerant of the very-low temperature part. (Ashibe JP, ¶ 17) Therefore, Ashibe JP fails to teach or suggest a gaseous refrigerant that in Nitrogen. As discussed above with regard to

claim 1, Ashibe JP and Ashibe US, alone or in combination, fail to teach or suggest a structure as recited in claim 5 including at least the claimed features.

For example, new claim 6 is dependent on claim 1 and further recites that a ring shaped member separates the gaseous refrigerant layer and the refrigerant liquid layer. As discussed above with regard to claim 1, Ashibe JP and Ashibe US, alone or in combination, fail to teach or suggest, at least the claimed features.

For example, new claim 7 is dependent on claim 6, and further recites that the ring shaped member comprises of silicon resin. As discussed above with regard to claim 1, Ashibe JP and Ashibe US, alone or in combination, fail to teach or suggest, at least the claimed features.

For example, new claim 8 is dependent on claim 1, and incorporate every feature of claim 1 and further recites, a block shaped member configured to separate the gaseous refrigerant layer and the refrigerant liquid layer. As discussed above with regard to claim 1, Ashibe JP and Ashibe US, alone or in combination, fail to teach or suggest, at least the claimed features.

For example, new claim 9 is dependent on claim 8, and further recites that the block shaped member comprises silicon resin. As discussed above with regard to claim 1, Ashibe JP and Ashibe US, alone or in combination, fail to teach or suggest, at least the claimed features.

Concluding Remarks

After amending the claims as set forth above, claims 1-9 are now pending in this application.

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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